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*** DIALOG HOMEBASE(SM) Main Menu ***

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1. Announcements (new files, reloads, etc.)
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?

B 705FTEXT1, 705FTEXT2, 705SOFT

>>> 278 does not exist

>>>1 of the specified files is not available

07sep04 09:47:12 User264671 Session D58.1

\$0.00 0.295 DialUnits FileHomeBase

\$0.00 Estimated cost FileHomeBase

\$0.09 INTERNET

\$0.09 Estimated cost this search

\$0.09 Estimated total session cost 0.295 DialUnits

SYSTEM:OS - DIALOG OneSearch

File 15:ABI/Inform(R) 1971-2004/Sep 06

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File 148:Gale Group Trade & Industry DB 1976-2004/Sep 06

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File 160:Gale Group PROMT(R) 1972-1989

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File 275:Gale Group Computer DB(TM) 1983-2004/Sep 06

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File 621:Gale Group New Prod.Annou.(R) 1985-2004/Sep 06

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File 636:Gale Group Newsletter DB(TM) 1987-2004/Sep 06

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Set	Items	Description
S1	14464	EQUIPMENT (W) MAINTENANCE
S2	1840832	DATABASE
S3	1196	S1 AND S2
S4	793	RD (unique items)
S5	11252500	PD<19990528
S6	107	S4 AND S5 ~ considerable
S7	410	ERVICE
S8	0	S6 AND S7
S9	530303	ASSET (2W) MANAGEMENT
S10	43305	S9 AND S5
S11	13656742	SERVICE
S12	10163	S10 AND S11
S13	909	S12 AND S2
S14	855	RD (unique items)
S15	2096466	REPLACE OR REMOVE OR REMOVAL
S16	78	S15 AND S14 < considerable

COST

07sep04 10:55:38 User264671 Session D59.2

\$4.10 0.759 DialUnits File15

\$0.00 35 Type(s) in Format 6

\$10.20 3 Type(s) in Format 9

\$10.20 38 Types

\$14.30 Estimated cost File15

\$10.15 1.880 DialUnits File16

\$0.00 50 Type(s) in Format 6

\$3.45 1 Type(s) in Format 9

\$3.45 51 Types

\$13.60 Estimated cost File16

\$7.74 1.434 DialUnits File148

\$7.74 Estimated cost File148

\$0.88 0.163 DialUnits File160

\$0.00 1 Type(s) in Format 6

\$0.00 1 Types

\$0.88 Estimated cost File160

\$1.88 0.349 DialUnits File275

\$0.00 2 Type(s) in Format 6

\$0.00 2 Types

\$1.88 Estimated cost File275

\$2.51 0.464 DialUnits File621

\$0.00 14 Type(s) in Format 6

\$0.00 14 Types

\$2.51 Estimated cost File621

\$4.30 0.797 DialUnits File9

\$0.00 14 Type(s) in Format 6

\$0.00 14 Types

\$4.30 Estimated cost File9

\$2.41 2.410 DialUnits File20

\$0.00 35 Type(s) in Format 6

\$2.95 1 Type(s) in Format 9

\$2.95 36 Types

\$5.36 Estimated cost File20

\$0.53 0.094 DialUnits File623

\$0.00 3 Type(s) in Format 6

\$0.00 3 Types
\$0.53 Estimated cost File623
\$1.62 0.287 DialUnits File624
\$0.00 7 Type(s) in Format 6
\$3.50 1 Type(s) in Format 9
\$3.50 8 Types
\$5.12 Estimated cost File624
\$4.30 0.797 DialUnits File636
\$0.00 24 Type(s) in Format 6
\$0.00 24 Types
\$4.30 Estimated cost File636
\$0.32 0.317 DialUnits File813
\$0.32 Estimated cost File813
\$0.43 0.084 DialUnits File256
\$0.43 Estimated cost File256
OneSearch, 13 files, 9.832 DialUnits FileOS
\$5.49 INTERNET
\$66.76 Estimated cost this search
\$66.84 Estimated total session cost 10.007 DialUnits

T S6/9/7, 8, 47, 91

6/9/7 (Item 7 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)

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00632938 92-47878

Maintenance Software: The Next Generation

Mullin, Rick

Chemical Week v151n8 PP: 33-34 Aug 26/Sep 2, 1992 CODEN: CHWKA9 ISSN:

0009-272X JRNL CODE: CEM

DOC TYPE: Journal article LANGUAGE: English LENGTH: 2 Pages

SPECIAL FEATURE: Graphs

WORD COUNT: 1078

ABSTRACT: Chemical companies are stepping up to a new generation of computerized maintenance management systems (CMMS) software designed to integrate maintenance functions with a broad range of management information systems. Software suppliers and chemical industry sources envision an important new role for the software - documentation and rapid report generation for compliance with the new environmental, health, and safety regulations, including OSHA-1910, and for ISO 9000 registration. Richard A. DeFazio of Operations Management Group describes an ideal system based on a client/server architecture, with minicomputers serving as databases for PCs. Linked to a computer-aided design system, the central database can generate reports such as material supply data sheets, as well as process and instrumentation diagrams, which are used by OSHA. Some major chemical companies say they are about to make their move. For example, Dow Chemical is reviewing commercial maintenance software for a global revamp based on system integration.

TEXT: Chemical companies, recognized as pioneers in the development and implementation of computerized maintenance management systems (CMMS), are stepping up to a new generation of software designed to integrate maintenance functions with a broad range of management information systems. While there is some disagreement over precise definition of state-of-the-art CMMS, software suppliers and chemical industry sources

envision an important new role for the software--documentation and rapid report generation for compliance with the new environmental, health, and safety regulations, including OSHA-1910, and for ISO 9000 registration.

Much of the chemical industry's early work on CMMS was done in-house with homemade software running on mainframe computers. Developments in computer technology and an explosion in the number of comprehensive off-the-shelf software offerings have, however, placed an emphasis on system configurations incorporating minicomputers and PCs on local area networks.

"I see the chemical industry going to the next generation of CMMS," says Richard A. DeFazio, a principal at consulting firm Operations Management Group (Atlanta). He defines this as a system based on open architecture for integration, relying on networks of PC workstations. DeFazio and others describe an ideal system based on a "client/server" architecture, with minicomputers serving as data bases for PCs. Linked to a computer-aided design system, the central data base can generate reports such as material supply data sheets, as well as process and instrumentation diagrams, which are used by OSHA.

"I think OSHA's process safety management codes will force any company without an effective maintenance system to get one," says Ben Burns, project manager with consulting firm Life Cycle Engineering (Charleston, SC). Burns notes, however, that many companies with computerized maintenance are not using computers effectively. He emphasizes that a great deal of planning and engineering must precede system development or selection. Systems must be maintained, and data must be entered correctly. Burns also sees a trend away from mainframes in the chemical industry, but notes that it is "a hell of a sacrifice when you get those big things up and loaded."

Bonner & Moore (Houston) is among the suppliers that have integrated what were once modular software packages for maintenance, inventory, and purchasing into a software package. According to Robert Blakeney, senior marketing associate, product development has followed the conventional wisdom of what a system should do--the firm has added a client/server alternative to its mainframe offering. Bonner & Moore's Computerized

On-Line Maintenance, Purchasing, and Store system, which it originally developed together with Amoco Chemical, keys on the CMMS function of tracking performance and work history in conjunction with accounting-related records on equipment and other assets across the plant.

Most other major suppliers have focused on a similar integration approach, with a choice of hardware implementation, most leaning toward the minicomputer/PC mix. Revere Inc. (Birmingham, AL), for example, runs its software on IBM AS400 and Hewlett-Packard 3000 minicomputers, adopting Unix-based systems as a standard for programming. Engineering firm Fluor Daniel (Irvine, CA) runs its CMS-Plus software on IBM AS400, Digital VAX minis, and IBM mainframes. Champs (Crystal River, FL) has broadened its mainframe approach with two new options running on the IBM AS400.

"Generally, in price performance, any time you have over 16 workstations, a minicomputer is the most effective," says Skip Gossman, senior accounts manager/petroleum and petrochemicals at the System Works (Atlanta), another major supplier. He also cites the move toward Unix-based operating systems, noting that his company's MPAC system integrates warehouse, purchasing, accounting, and human relations functions.

Moving on from the mainframe, some vendors, including PSDI (Cambridge, MA), cite the power of PC technology in advocating local area networks that forgo minicomputers. Most vendors, in fact, acknowledge a place for all-PC systems, though many note size and computational speed limitations. "The optimum architecture uses PCs to do graphics, imaging, and computing, with a minicomputer as a data base," says David Fisk, a sales representative for Marcam (Newton, MA).

MAJOR MOVES. Some major chemical companies say they are about to make their move. Dow Chemical, for example, is reviewing commercial maintenance software for a global revamp based on system integration. It will be coming off a homegrown approach.

"I hate to admit it," says John Gledhill, who heads up engineering, construction, maintenance, and labor relations at Dow's Michigan division, "but we developed our own system." Dow's Equipment Maintenance Tracking

System (EMTS) grew in the early '80s from the need to integrate maintenance with other computer systems running on mainframes--a function that Gledhill says could not be achieved with commercial software at the time. He describes EMTS as modular, covering work order scheduling, job costing, personnel planning, and spare-parts inventory.

By current standards, however, EMTS has its limitations. For example, the system interfaces online with purchasing, but not engineering, because engineering is run on a minicomputer with no online link to mainframes. Gledhill says the company's current priority is integration of maintenance, financial, and engineering on a global computer network.

"We are looking at standard offerings, but we want to minimize customization," Gledhill says. He notes, however, that Dow will have to make some concessions, given that the best software available covers about 85% of the company's needs. Dow is currently considering five suppliers for the project, having narrowed the list down from "hundreds," Gledhill says.

The Tennessee Eastman division of Eastman Chemical recently finished shopping for software to link a global maintenance computing system. Dennis Hines, principal industrial engineer, says the company will go with software supplied by SAP (Walldorf, Germany). "We're looking for better job integration with engineering and inventory management," says Hines, noting that such integration is a weakness at Eastman, given that the firm uses different software at different sites, all on mainframes.

While the new approach will afford greater integration, it will likely still be a modular system run on a mainframe system. A spokesman for SAP America (Philadelphia) says the company is about to introduce its client/server technology, but that maintenance will not be included when the system is introduced next year.

OSHA requirements are cited by sources at several other companies, including Hoechst Celanese and Olin, as driving forces in the current reevaluation of software and architecture for maintenance. In the U.K., Hydro Polymers (Newtown Aycliffe), is about to install its first computerized maintenance system using PSID software. According to Hydro Polymers systems engineer John Richardson, reporting functions will help

with European Community and U.K. regulatory requirements, but the big drive is to get off its current "mix of computers and paper" and automate links between maintenance accounting and engineering.

THIS IS THE FULL-TEXT. Copyright Chemical Week Associates 1991
GEOGRAPHIC NAMES: US

DESCRIPTORS: Chemical industry; Software; Maintenance management; Systems integration; Minicomputers; Trends; Systems design; Data bases
CLASSIFICATION CODES: 5240 (CN=Software & systems); 8640 (CN=Chemical industry); 9190 (CN=United States); 5130 (CN=Maintenance)

6/9/8 (Item 8 from file: 15)
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00614992 92-30095
MedEcon to Unveil Asset Management Program in June
Barlow, Rick Dana
Hospital Materials Management v17n5 PP: 1, 9 May 1992 JRNL CODE: HMA
DOC TYPE: Journal article LANGUAGE: English LENGTH: 2 Pages
WORD COUNT: 1180

ABSTRACT: On June 15, 1992, MedEcon Services Inc. will introduce a new asset management program that aims to provide members with data on total cost of equipment ownership. The new TEC Guardian program weds the Total Equipment Concepts program to a maintenance insurance company that services MedEcon hospitals, CMI Group Inc. Among other things, CMI brings to TEC Guardian a database of more than 90,000 repair events that enables it to project accurate equipment service costs for virtually any piece of medical machinery. TEC Guardian has been designed to compete with General Electric's Maxilease program and a similar program from Picker International. The likely outgrowth of this program is fee-per-use contracts, currently gaining in popularity as efficient financing options in the wake of Medicare's new capital pass-through rules.

TEXT: Louisville, Ky.--MedEcon Services Inc., Louisville, Ky., is set to launch a new asset management program June 15 that aims to provide members with data on total cost of equipment ownership and hopes to save members 20% to 30% of the cost of service contracts, HMM learned.

The new TEC Guardian program weds the Total Equipment Concepts program to a Milwaukee-based maintenance insurance company that services MedEcon hospitals, CMI Group Inc. MedEcon offers a database, acquisition consulting, vendor contracts, combined purchase forecasting and health care furnishings; CMI offers the identification and assumption of risk, electronic equipment protection, parts and maintenance resources, consulting services and accurate loss and reporting systems.

What CMI also brings to TEC Guardian is a database of more than 90,000 repair events that enables it to project accurate equipment service costs for virtually any piece of medical machinery.

Karen Malin, director of program marketing for MedEcon's TEC and director of the new program, revealed details of the plan to HMM at LINK '92, the group purchasing organization's national meeting here last month.

CMI had this database for several years, using it to service and maintain equipment purchased under the TEC program. But CMI will now use it to evaluate equipment based on service and repair records before it is purchased, by forecasting total repair costs based on actual repair history. Using this information, TEC Guardian will help members control what they spend annually for equipment.

"Our members have wanted bits and pieces of this for a long time," said Niklaus Fincher, TEC's director of program development. "We just put it all together under one program." Fincher left MedEcon two weeks ago after 3.5 years to pursue personal interests.

"As far as we know, there are no other purchasing groups offering something like TEC Guardian as a total program because of the risks involved," Malin said.

"With TEC, the missing piece (of the equipment evaluation puzzle) has always been finding the repair histories of equipment. Vendors may have them for only their equipment, but they won't reveal that information to the hospitals," Malin said.

SERVICE COSTS REDUCED

Equipment maintenance has become a major profit center for manufacturers, accounting for 30% to 40% of profits, Fincher told HMM. The estimated market for maintenance and service of imaging equipment alone is \$3 billion, he said.

Service contracts tend to average 10% of the original purchase price per year depending on projected usage. Service contracts, however, often limit repairs to between 9 a.m. and 5 p.m., when hospitals need equipment to be fully operational.

"If service contracts are not developed correctly, you could be spending more for non-covered expenses, meaning that if certain repairs were not specified correctly along with parts and labor in the contract, your facility could be charged an additional cost," Fincher said.

Normally, vendors provide repair options, such as 8 a.m. to 5 p.m., 8 a.m. to 8 p.m., or 24-hour-a-day service. Prices are significantly higher for longer repair periods. Hospitals face steep surcharges if repairs are done anytime outside the contracted period or if parts have to be flown in overnight.

"A \$1 million computed tomography scanner can cost up to \$5 million if you break it down into its component replacement parts," Malin said.

"Manufacturers mark up the prices of replacement parts significantly, regardless of where they bought them, because that's a way for them to make money."

A piece of equipment may have an excellent overall service history except for one component, she said. For example, patient monitors may be good workhorses, but their software tends to be problematic. "Looking at the

repair history through TEC Guardian, you'll know which brands breakdown the most and you could negotiate in your contract a provision that all your software enhancements be offered at no charge." The program also will include estimated costs-per-procedure so the hospital can negotiate more attractive fee-per-use rentals or leases.

CMI REQUIRES NOTICES

The CMI maintenance contract stipulates that hospital clients must inform CMI if they have to make any repair on a piece of equipment that costs more than \$10,000 per repair visit, which is how CMI developed its database. CMI will consult with the hospitals about where they can obtain needed replacement parts at lower costs. If the hospital requests it, the original vendor can still install those parts.

If a hospital has to pay \$125,000 for repairs under a typical service contract, but knows that TEC Guardian can guarantee the same repairs for \$100,000, that hospital will pay CMI \$100,000. In the past, if actual costs exceeded CMI's guarantee, Lloyd's of London paid the excess under an insurance policy. Under TEC Guardian, MedEcon assumes that role.

If TEC Guardian manages to spend only \$75,000 of that \$100,000, the \$25,000 savings is split between the hospital, MedEcon and CMI. "We're not going to equally split that savings," Malin insisted, "but we will allow the hospital to share the profits. Those formulas are being worked out.

"The hospital won't recoup all of that money because MedEcon is assuming the risk of insuring the lower costs and must set aside reserves to cover losses," she continued. "We also need to be able to cover the costs of all of the administrative work." TEC Guardian costs subscribers \$10,000 per year, up from \$8,000 under the TEC program.

TEC Guardian has been designed to compete with General Electric's Maxilease program and a similar program from Picker International. The likely outgrowth of this program a fee-per-use contracts, currently gaining in popularity as efficient financing options in the wake of Medicare's new capital pass-through rules.

FEE-PER-USE THE NEXT DIRECTION

"Fee-per-use is the natural direction we're moving toward with TEC Guardian, as well as other methods of alternative financing," Malin told HMM. "We are exploring these areas with a number of firms." She declined to identify the companies in contention or reveal a timetable for offering such contracts.

"Fee-per-use contracts may be the only way for companies to sell equipment now that people are so afraid to buy," Fincher said. "The problem with fee-per-use, however, is that the source of funding goes to the vendor. You have to put into your contract an operating lease that allows you to purchase the equipment outright as soon as you reach the break-even point, so that you don't pay more than you should to the leasing companies."

Targeted hospitals for TEC Guardian include current TEC and CMI customers, Malin said. TEC members now have a one-year membership and when they renew they will be converted to TEC Guardian. Previous programs will be phased out. The last TEC member joined in March and will join the new program in March 1993.

Malin estimates that in three years, membership in TEC Guardian should increase by 50%.

Equipment contracts were established in 1974. The original TEC program, Technical Equipment Consultation, was launched in 1988 and added consulting services as a separate entity. TEC was modified on January 1, 1992, into Total Equipment Concepts, which combined complete contract and consultation services into a single program. (See "MedEcon weds equipment, consulting programs," HMM, March 1992, page 7).

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COMPANY NAMES:

MedEcon Services Inc

CMI Group Inc

GEOGRAPHIC NAMES: US

DESCRIPTORS: Asset management; Medical devices; Health care industry;

Capital expenditures; Maintenance costs; Data bases
CLASSIFICATION CODES: 3100 (CN=Capital & debt management); 3400
(CN=Investment analysis); 8320 (CN=Health care industry); 5130
(CN=Maintenance); 9190 (CN=United States)

6/9/47 (Item 24 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
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01506639 Supplier Number: 41830929
Computer system aids in maintenance
Boxboard Containers, p35
Feb, 1991
ISSN: 0006-8497
Language: English Record Type: Abstract
Document Type: Magazine/Journal; Trade

ABSTRACT:

Harry Rohde Management Systems (Elmhurst, IL) has launched its plantwide computer program for equipment maintenance, the Maintenance Manager. The user can develop an historical database of maintenance performed on equipment in place, and can be detailed to include individual parts of the equipment. The program can project work orders for scheduled maintenance and track maintenance done on contract. It can provide a history of maintenance costs for each machine, including maintenance manhours.

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PUBLISHER NAME: Intertex Publishing Corp.
COMPANY NAMES: *Harry Rohde Management Systems Inc.
EVENT NAMES: *330 (Product information)
GEOGRAPHIC NAMES: *1USA (United States)
PRODUCT NAMES: *7372490 (Applications Software NEC)
INDUSTRY NAMES: BUSN (Any type of business); CONT (Containers and Packaging)
NAICS CODES: 51121 (Software Publishers)
SPECIAL FEATURES: COMPANY

6/9/91 (Item 4 from file: 624)

DIALOG(R)File 624:McGraw-Hill Publications

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0163188

Equipment maintenance

Engineering News-Record October 5, 1989; Pg 42; Vol. 223, No. 14

Journal Code: ENR ISSN: 0013-807X

Section Heading: Computer Products and Services

Word Count: 73

TEXT:

A new software program is designed to help construction firms keep records of equipment repair, maintenance schedules, parts usage and fuel usage statistics. Written in database language, the program provides multiuser capability and user-defined report generation. It can import and export data to Lotus spreadsheets. It can interface as well to a full-powered cost accounting system to permit users to monitor expenses. CONTROL DATA, 6443 S.W. BEAVERTON-HILLSIDE HWY., SUITE 305, PORTLAND, ORE. 97221

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00777176 94-26568

Changing workplace practices

Carlopio, James

International Journal of Operations & Production Management v13n7 PP:

57-68 1993 CODEN: IOPMDU ISSN: 0144-3577 JRNL CODE: IJO

DOC TYPE: Journal article LANGUAGE: English LENGTH: 12 Pages

SPECIAL FEATURE: References

WORD COUNT: 5547

ABSTRACT: Some of the benefits and problems of work organization rules are explored from both the workers and the managers perspective. Several of the properties and functions that make work organization rules critical and resistant to change are examined. Finally, ways to facilitate the needed changes in workplace practices are discussed. The first step toward successfully changing work rules, shopfloor practices, and award agreements is to identify the specific social and economic purposes that they serve in the organization from the perspectives both of labor and management. A 2nd step is to consider the perceptions of the stakeholders regarding management's reasons and motivations for the changes. A 3rd step is to consider the effect of management's change strategy.

TEXT: There is much evidence that existing workplace practices in industry must be changed. Our firms cannot compete in the new global economy and global markets with workplace agreements which have become outdated, costly, and restrictive. Unfortunately, many organizations are finding it extremely difficult to change existing work practices, to break down lines of demarcation and work rules, and to implement necessary human resource and work organization innovations. Although both management and labour historically have favoured some set of rules outlining the organization of work, there is a growing perception that the whole system of work rules in industry has become increasingly rigid and may no longer serve the needs of either party. Rules are invisible threads which bind the technical and the social components of an organization[1]. Rules come from past adjustment and seek to stabilize the present and future. In the past, both management and labour benefited from having a set of rules regulating the organization

of work.

The main purposes of this article are to:

- (1) explore some of the benefits and problems of work organization rules from both the workers' and the managers' perspective;
- (2) examine several of the properties and functions which make work organization rules critical and resistant to change; and based on the analyses
- (3) discuss ways to facilitate the needed changes in workplace practices.

THE IMPORTANCE OF WORKPLACE RULES FOR WORKERS

Workplace rules perform a variety of functions for workers. For example, earlier in this century, many work rules were instituted which were intended to organize work in order to make more work, more jobs, and more money for labour and its trade unions. These rules are now referred to as "make work" rules. The efforts of unions to "make work" by various methods have been primarily attributed to the insecurity of employment in modern industry[2,3]. According to Slichter[2] efforts to "make work" fall into nine basic categories:

- (1) limiting daily or weekly output;
- (2) indirectly limiting the speed of the work;
- (3) controlling the quality of work;
- (4) requiring time-consuming methods of doing the work;
- (5) requiring that unnecessary work be done or that work be done more than once;
- (6) regulating the number of men in a crew or on a machine or requiring the employment of unnecessary men;

(7) requiring that the work be done by members of a given skilled craft or occupation;

(8) prohibiting employers or foremen from working at the trade;

(9) retarding or prohibiting the use of machines and labour-saving devices.

Rules such as these are often seen as restrictive to firms and damaging to the national economy.

Wage earners have historically banded together to gain some measure of control over their lives at work. They wished to protect and to strengthen their union organization, to allocate limited work opportunities, to make more work, and to insulate themselves against the impact of changing technology[2]. Underlying these specific purposes, however, is a larger desire to regulate relations on the shopfloor and within the organization as a whole, in order to give workers some protection from arbitrary management decisions. In this way a method of "industrial jurisprudence" has been built up. Bargaining between labour unions and employers has introduced civil rights into industry. Management must be conducted by rule. The growth of unions and award negotiations has promoted the utilitarian, rational-legal type of contractual relationships between management and labour[4].

The importance of workplace rules for unions and their members does not derive solely from their capacity to control or limit the power of management. According to Piore and Sabel[5], if there is one undisputed finding of industrial sociology it is that "In every known society in which the division of labor is not fixed by custom, workers doing related tasks attempted to gain control over their workplace". They describe a "contest for power" articulated through both written and unwritten rules which "constitute a system of shopfloor control". Under the mass-production model of shopfloor control there are two main elements:

(1) jobs--precisely defined aggregates of well-specified tasks; and

(2) seniority--length-of-service criterion for the allocation of jobs.

Workers' income, job security, quality of life, and so forth, depend on the definition of jobs and seniority. The struggle for control on the shopfloor is over task classification and the allocation of jobs; a struggle which, in turn, reinforces these two central concepts as structuring elements of shopfloor life[5]. Thus, establishing a set of workplace rules gives unions and their members power in the form of day-to-day influence over working conditions. It gives them the ability to work-to-rule, job protection (i.e., protection against speed-up and job loss out of seniority order), worker safety, fair treatment, and work life quality (i.e. workers can choose a "type" of work they desire). Having identified the complexity of functions (e.g. direct empowerment, limiting managerial power, and protecting past gains) which makes workplace rules important for workers, it is easier to see why workers will invariably resist proposed changes to these rules.

THE IMPORTANCE OF WORKPLACE RULES FOR MANAGERS

Managers in every organization face the task of somehow reducing the variability, instability and unpredictability of individual human acts[6].

The importance of conformity to organizational rules is greater in complex, interdependent organizations than in simpler ones. If for example, one of 100 people independently working fails to produce, production is cut by 1 per cent. If one of 100 people working on an interdependent assembly line fails to produce, production does not suffer by 1 per cent, production is reduced to zero.

Gouldner[7] examined rules at work in the context of bureaucratic rules and the issue of close supervision. He identified and discussed several generic functions of rules at work. Rules serve an explication function. They comprise a functional equivalent for direct, personally given orders. In this light, rules are a form of communication to those who are seen as desirous of evading responsibilities, of avoiding commitments, and of withholding proper and full performance of obligations. Rules serve a screening function as they provide a substitute for the personal repetition of orders by a supervisor. They also allow supervisors to claim authority without personal superiority (i.e. "I'm only following the rules"). Rules serve a remote control function allowing upper management to "control from

a distance" its lower level of management. Bureaucratic rules will flourish, other things being equal, when upper management has a degree of distrust and suspicion regarding the role performance of those to whom they have delegated a measure of command. Rules serve to legitimate the use of punishment. The rule constitutes a statement in advance of expectations or a warning. Rules have a "leeway" function and are enforced in a curiously rhythmic pattern. In different contexts, rules may be enforced or relaxed. Finally, rules serve as a specification of a minimum level of acceptable performance.

PROBLEMS WITH WORKPLACE RULES

Gouldner[7] made three assertions concerning bureaucratic rules at work. He suggested that bureaucratic rules proliferate when a social organization is driven by the following tensions:

- (1) pervasive managerial distrust and suspicion which is directed not only towards workers but also towards members of the managerial in-group;
- (2) disturbances in the informal system which result in the withholding of consent from the formally constituted authorities, i.e. the informal group is either unwilling or unable to allocate work responsibilities and give no support to management's production expectations; and
- (3) the appearance of status distinctions of dubious legitimacy, in an egalitarian culture context, which strain the formal authority relationships.

Although workplace rules may have benefited labour and management in the past, highly developed, precise systems of workplace rules are beneficial only under certain conditions. They suit particular styles of hierarchical management; for example, "scientific management's" concern for saving time and increasing output. They are functional only to the extent that they fit with the mode of production such as the stereo-typical assembly line with its emphasis on job simplification, rationalization, and fractionalization. Changes in production can render existing rules redundant or may demand a radically new structure or order to the shopfloor. In this way rule systems become problematic.

Employers would like to have the freedom to pick the best available worker for a job. The most frequent complaint of employers concerning union shop roles and policies is that they limit the efficiency of labour and reduce the output of industry. Union rules may restrict production in several ways:

(1) they may interfere with management's freedom to pick the best workers available and to stimulate efficiency through rewards and punishments;

(2) they may restrict the introduction of more productive methods and machines;

(3) they may deliberately "make work"; or

(4) they may have become obsolete. Changes in technology and markets as well as competition constantly make some shop rules and policies out of date. The greatest problem with rules is that most bad rules were once good, designed for a situation that no longer exists[1].

From a management perspective, the current organization of work is excessively rigid and wasteful, thus impeding the implementation of advanced manufacturing and information technologies and leading to unreasonably high labour costs[8-10]. Today, changes in technology require workers to perform a wider range of tasks[11,12]. New team-based approaches require some workers to move more frequently between various jobs and functions[12]. The lack of flexibility in worker deployment which can result from strictly and narrowly defined work rules is perceived by management as a serious problem[10,13,14]. For example, journeymen seeking to regulate the dividing line between their work and that of helpers and labourers, as well as from encroachment by other crafts, has led to over-staffing and a situation where one skilled worker has to wait for another to perform some simple activity before continuing with the job at hand.

Organizations and their environments change faster than rules. Originally, rules mainly applied to the discipline of the workforce. Later, they become protective as well as restrictive. They protect not only the nature and organization of work but also protect and entrench power relations within

the organization around a set of objective codes and standards. In this way they apply to management as well as to the worker. A rule is double-edged; it limits both the rule maker and the potential rule breaker.

WHY WORKPLACE RULES ARE DIFFICULT TO CHANGE

When a legal system changes it can be seen as a cyclic process alternating between "disruption" of an established order and the "planning" which institutes a new legal order. Industrial law behaves similarly to societal law in the open systems framework. A simple, clear-cut rule develops. The rule becomes riddled with exceptions. It is challenged based on changing circumstances affecting values and attitudes of society. Finally, a new rule or legal system is developed basically made up of new simple, clear-cut rules thus propagating the cycle. The process of changing the tough, invisible threads of the system loosens all kinds of bargains, agreements, and pay-offs which must be brought back together. Therefore, rules are difficult to change[1,2].

Changing existing work practices has been especially difficult in Australia. For example, Macken[15] has suggested that, since the Australian trade union movement is so large and strong, as industrial relations and workplace structural changes are made leading to the amalgamation of unions, very little substantial change will be achieved in the short run due to resistance from those adversely affected by the changes. Curtain[16] has suggested that the relatively high levels of employee turnover in Australia have led to low levels of commitment in the employed labour force adversely affecting many firms' ability to change work practices. Curtain[16] also noted the legacy of "structural irresponsibility" in workplace industrial relations, a low level of adoption of world-class best practice techniques, and the problem of expectations being raised unrealistically quickly have all contributed to the difficulties of Australian workplace change.

Work rules not only address the basic economic interests of workers such as earnings or job security but also, as we can see from our previous analyses, many existing work practices and rules fulfil social ideals or values such as equal opportunity or they establish a code of fairness. As a result, rules are not simple conventions which can be "legislated" away or

mere economic commodities which can be "bought out". Once it is recognized that all work customs and practices serve a social as well as an economic purpose, we are on the threshold of being able to alter the arrangements by dealing with their underlying causes[17].

HOW TO FACILITATE CHANGES IN WORK RULES

The first step towards successfully changing work rules, shopfloor practices, and award agreements is to identify the specific social and economic purposes which they serve in the organization from the perspectives both of labour and management. We know that rules have served important functions both for management and for labour in the past. Once these are identified, it becomes possible to explore ways of fulfilling those needs in other ways, thus facilitating the process of change by reducing resistance.

A second step towards successfully changing work rules, shopfloor practices and award agreements is to consider the perceptions of the stakeholders regarding management's reasons and motivations for the changes. Workplace rule systems can be difficult to change because the motivation for the changes is not made clear. Workers may believe that management has a hidden agenda in introducing new practices, particularly those deriving from technological innovation. Thus many modern labour officials and workers feel threatened, as were earlier industrial workers, by their perceptions of the use by management of the machinery as a means of, and a camouflage for, an attack on labour[18]. Management can be perceived as trying to use new information, and manufacturing technologies to centralize control, weaken unions, reduce wages, and intensify the work pace. Alternatively, they may be seen as attempting to decentralize control and empower employees and their unions. Regardless of the "real" intentions or motivation, perceptions are reality in terms of driving peoples' behaviours.

One of the organizations which was studied by Turniansky[19] provides a case in point. When a firm introduced CNC equipment within a flexible machining cell, the managers proposed several changes in work organization. Management suggested protecting workers in the manufacturing cell from

bumping[20] as well as requiring workers to do machine programming, deal with vendors and customers, work on interchangeable jobs, rotate shifts, and change work schedules. The proposed work reorganization was rejected by the union on the grounds that management was at the same time laying off 1,500 workers. The union leadership said that they could not trust management to protect workers from displacement due to technology or productivity increases and they did not accept the work redesign proposal. It is clear in this case that the relationship between the union, management, and the workers, which depended on how people perceived current actions in light of past actions and the levels of trust among those involved, affected the ability of the system to implement and to adapt to changes in work organization and new technology. Employees and unions have historically not resisted technological innovation. However, they have reacted bitterly against what they perceive as exploitation, degradation, and unhealthy or unsafe working conditions[21].

Another example of the importance of management reasons and motives for workplace change can be seen in the case of the implementation of advanced manufacturing technology. The motivation behind technological innovation affects the nature and extent of the corresponding organizational changes required and consequently the workers' response. The successful use of new technology often depends on good planning, effective work organization, and appropriate job design. The introduction of new technology frequently requires changes in organization structure and task allocation. MacDuffie and Kochan[22] provided evidence in support of the hypothesis that it is the integration of technology strategy with human resource strategy, production strategy, and overall business strategy which contributes most effectively to high economic performance. In short, recent research has clearly illustrated that the introduction of new technology frequently requires changes in organization structure, job design, and organizational strategy in order to produce real benefits.

However, there may be a variety of reasons for introducing new technologies. A study by Davies[23], carried out in the United Kingdom, suggested three broad categories of reasons for the introduction of technology;

(1) people reasons, e.g., reduce workload or improve working conditions;

(2) production reasons, e.g., replace worn out equipment or expand production;

(3) finance reasons, e.g., reduce labour or meet competition.

Davies reported that people reasons were rated by managers as being the least important of the three categories. Production reasons were the most frequently reported, while finance reasons were second. The two most popular specific reasons given for the implementation of computerized equipment were to reduce labour costs (a finance reason) and to improve quality (a production reason). Crucially, however, the managers interviewed by Davies placed a great deal of emphasis on the increase in control which they were afforded by the new technology. This suggests a fourth category, political reasons, where the objective might be to bring about a shift in the balance of power between management and workers and not simply to change the nature or organization of work. It should be clear that, if stakeholders perceive that political reasons are the major drivers for management's initiation of changes, this will result in lower levels of acceptance and success of the work organization and the new technology. If people, production, or external financial reasons are perceived as being the major drivers, however, this may result in less resistance to change.

A third step towards successfully changing work rules, shopfloor practices, and award agreements is to consider the effect of management's change strategy. When making changes to the design of work, the method of change may be more critical than the changes themselves. Walton[24] suggested that leaders seeking change can adopt a power strategy which requires individuals or groups to: increase their relative power by increasing the other parties' dependence on them; decrease their dependence on the other parties; and overstate their needs and preferences, in terms of achievement of stated objectives, to bias the rival groups' perceptions. Alternatively, Walton proposed that managers could adopt an attitude-change strategy which is done by increasing the level of attraction and trust between persons or groups involved. Walton cautioned that there may be dilemmas in attempting to pursue both strategies at the same time due to contradictory tactics and demands on the leaders. In addition, a genuine attempt to adopt a strategy

based on attitude change is ideologically opposed to one based on coercion. Similarly, Cappelli and McKersie[25] suggested two general sets of corporate management strategies which influence strategy and decisions throughout the firm: asset management strategies and productivity enhancement management (or value-added) strategies. Asset management strategies shift a firm's capital away from high-cost employees and work systems. This may be done by closing union facilities, by subcontracting components of work (outsourcing) or by investing in new technology used to reduce labour (and labour costs). By contrast, value-added strategies reform existing systems, usually by altering the organization of work through changes in work rules and the design of jobs. Curtain and Mathews[26] have identified two specific idealized models of award restructuring in Australia; which mirror the more generalized strategies identified by Cappelli and McKersie. A cost-minimization approach, according to Curtain and Mathews, is a narrower approach based on horizontal job loading, no additional formal training, the use of technology to intensify work, surveillance and control while using more subcontractors and part-time-casual employees to reduce costs via numerical flexibility. Their productivity enhancement approach is more broadly based on work reorganization, workforce skills acquisition and formal training, delegation of responsibility and decision making, and employment security guarantees as a basis for achieving more flexible use of employee skills. Cappelli and McKersie[25] suggested that management's success in achieving these changes varies in large part with their ability to address the following issues:

- (1) labour's job security and the organization's plans for expansion (either increases in production or the re-call of outsourced work);
- (2) the level of trust and general relations between labor and management;
- (3) the need for an internal model of innovative work organization;
- (4) the need to use "greenfield sites" or to couple work reorganization with major retooling and facilities or equipment alterations; and
- (5) the need to consider the entire system and how changes in work

organization interact, e.g., changes in production standards or expanding work horizontally or vertically, will necessitate alterations in compensation if the work changes are to be accepted by employees.

Although managers have decision latitude they remain constrained by their internal and external environments[27,28]. Therefore, not all managers may equally be able to choose between these two idealized strategies proposed by Cappelli and McKersie[25] and Curtain and Mathews[26]. For example, managers in highly unionized firms are less likely to adopt a union avoidance strategy than are managers in less unionized firms[29]. Three critical decisions which managers must make concerning their workplace change strategy are:

- (1) how much to involve employees in decisions made prior to and during the change process;
- (2) how quickly to institute the proposed changes; and
- (3) how much advanced notice to give the workforce regarding proposed changes.

According to Turniansky[19], although managers, engineers, and supervisors involved in technology-driven organizational change, stated that employee and union involvement in the change process is necessary, the level of actual involvement which occurred was quite low. Participation in decision making is not a management panacea, but perhaps the key requirement for participation to be useful is that the subordinate has expertise to bring to the decision-making process[30]. Locke et al.[30] suggested that it makes little rational sense to involve someone in a decision process concerning a topic about which they know nothing, solely on the basis of some moral or ethical imperative. Workers know a great deal about the physical aspects of their work and work environment; for example, participative ergonomics programmes have frequently been successful[31,32]. Similarly, workers can add a great deal to decisions regarding the organization of work. Baitsch and Frei[33] argue that participation in the change process is important for the success both of the redesign of the work organization and of the introduction of new technology. There are many

examples of how long-standing problems in production have been overcome through co-operative problem solving between managers and workers[34].

In Australia, Curtain[35] has identified five main deficiencies in the process of implementing workplace changes in the public sector. Based on his research of the five Australian rail systems' efforts to institute change based on the structural efficiency principle, he suggested that confusion about implementation methodology, change being driven from the top only, attempted reforms under award restructuring being isolated from other organizational changes, the wrong sort of consultation, and a lack of agreement on underlying principles to guide the change process have all had negative effects on outcomes. For example, he suggested that across-the-board job redesign followed by the development of a new job classification structure (i.e., a conceptually bottom-up approach). Although the content may be basically the same, the process is critical to the success of the changes.

Another issue related to these strategic considerations in implementing organizational change is that of pace of change. Management can decide to implement changes "all at once" or incrementally. Very little work has been done concerning the optimum pace when implementing new work organization or technology. Roitman et al. [36], however, described the negative consequences of using an "all at once" approach to the implementation of innovative technology and social system features. They suggested that attempting to implement these changes too quickly will not allow sufficient planning and resources to be devoted to preparing the social system to match the new technological system. However, a US National Academy of Sciences panel reported that contrary to popular belief, the rapid adoption of new technology actually creates higher wages and less unemployment than gradual innovation[37]. More recent work by Dunphy and Stace[38] in Australia may reconcile these two seemingly contradictory findings by introducing a contingency framework of analysis. They provided compelling evidence that when an organization is greatly out of fit with its environment, more radical, transformational corporate change strategies work better than incremental strategies. When an organization needs only minor adjustments and is not very far out of fit with its environment, however, more incremental change strategies lead to better performance.

Management also needs to decide how much, if an advanced notice to give its workforce regarding changes. The issue of advanced notice of technology change is being dealt with at the local and national union levels of bargaining in the US[39]. The National Academy of Science panel does recommend that the US government should either require, or encourage through tax incentives, firms to supply advanced notices of plant closings and mass lay-offs[37]. In Australia in 1984, some unions were granted the legal right to be informed and consulted about decisions to implement new technology by the Australian Conciliation and Arbitration Commission. This ruling applies to all workers covered by Federal (i.e. national) awards[40].

CONCLUSION

Over the last few years, negotiations in many industries have resulted in modifications in work rules which have tended to reduce their rigidity and their "make work" nature. These changes have included the broadening of job classifications, making work schedules more flexible, and accepting team-based work[8,10,41,42]. It is worth noting, however, that to a great extent union acquiescence to these changes, at least in the US has resulted more from threats of plant closures than from positive agreements about the effects of work rules[9,10,43-46]. In Australia, it seems as though negotiations over award restructuring and its implementation have been sluggish and have needed to be pushed along by government wage incentives[42].

According to McKersie and Hunter[17], the abandonment of restrictive rules is likely to mean some displacement of labour. They suggested that the more obsolete the rule and the greater, therefore, the number of jobs temporarily created by it (i.e., the more burdensome the rule from management's point of view), the greater is the opposition within the union to its abandonment. However, no restrictive rule, no matter how burdensome to employers and even injurious in the long run to union members, is purely an arbitrary obstruction; it is some political device for protecting someone from some perceived danger. Consequently, the willingness of the union to abandon the workplace rule may depend on the willingness of employers to offer the union an alternative form of protection from the

danger against which the rule was originally directed. If the union waits too long before giving up burdensome restrictions so that drastic action is necessary to keep the union employers in business, it not only may receive nothing in return for dropping the restriction but may be compelled to accept severe wage cuts as well. When the union recognizes that it must help to reduce costs to be competitive and/or viable, one of the most obvious steps is to get rid of rules and practices which are wasteful and burdensome to employers, and beneficial only to small groups of workers. McKersie and Hunter[17] argued that unions should take the position that the special privileges for a few of its members must be sacrificed to help the many. These arguments are persuasive. If we assume that work rules exist to serve real needs in the employment relationship, then in order for them to change under conditions of equal power and influence, both management and labour must expect to gain from their revision.

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CLASSIFICATION CODES: 2500 (CN=Organizational behavior); 6100 (CN=Human resource planning); 9150 (CN=Guidelines)

16/9/44 (Item 7 from file: 20)

DIALOG(R)File 20:Dialog Global Reporter

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**World's Leading Steel Manufacturer Deploys Web-Based Asset Management
Application Developed With Unify VISION**

BUSINESS WIRE

February 02, 1999

◦ JOURNAL CODE: WBWE LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 932

SAN JOSE, Calif.--(BUSINESS WIRE)--Feb. 2, 1999--

Sumitomo Metal Industries Ltd. System Administrators

Make Better Decisions About Computer Hardware and Software Assets
by Inputting, Viewing and Analyzing Asset Data Via a Web Browser

Today Unify Corp. (NASDAQ:UNFY), a leading provider of Internet application server solutions, announced that Sumitomo Metal Industries Ltd. (SMI), one of the world's largest steel manufacturers based in Japan, has successfully developed and deployed a web-based computer asset management system developed with Unify VISION(R) AppServer and AppBuilder.

"Maintaining control of our IT assets is extremely important, and we expect asset management solutions to be accurate and timely," explained Kouichi Horio, assistant general manager of SMI's information technology organization. "With Unify VISION, we were able to leverage our existing Intranet structure and replace a paper-based, labor-intensive asset management system with a productive and efficient system that provides precise budgeting and forecasting along with better control of tax, leasing and licensing costs."

SMI has over 6,000 workstations and personal computers, plus servers, peripherals and network equipment. The company uses thousands of software licenses for Microsoft Office, Ichitaro, Matsu, Kiri (Japanese software products), legacy and proprietary applications.

SMI's asset management application keeps a database of all system objects, including all hardware and software tabulated by system management tools as well as information related to these objects such as audit records of hardware and software purchases, moves and disposals.

The application's logic compares the two lists to reconcile differences and maximize what is known about the assets. This solution is necessary because with 150 IT staff at 30 locations, there are continual organizational changes which generate equipment additions, movements and status changes.

The Unify VISION-based asset management application allows SMI's IT staff the ability to have simultaneous access to the asset database and necessary tools to update their local asset inventory at any time and to provide insightful analysis to make critical business decisions.

"Unify VISION AppServer and AppBuilder's productive development environment and its ability to generate complete Java applications without any Java programming enabled SMI developers to meet their tight delivery deadline for a fully functional, Y2K-compliant application," said Manabu Hori, president of Unify Japan. "We are pleased that we are able to respond to our customer's requirements of rapidly developing and delivering their mission critical applications which increases their competitive advantage and market share."

"Using Unify VISION, we were able to deliver critical functions like data updating and batch processing quickly with high quality. It took only a fraction of the budgeted time to develop this web application, without any Java programming knowledge," noted Shunji Kimura, SMI system engineer.

About Unify VISION AppServer and AppBuilder

Unify VISION AppServer is an open, standards-based Internet application server that enables IT organizations to bridge legacy, custom-built and packaged applications with the Internet. Its universal client architecture enables users to access any application, anywhere, anytime.

Unify VISION AppServer's Parallel Dynamic Scalable Architecture delivers a high level of performance, availability and scalability by offering server replication, load balancing, fail-over and recovery, and publish-and-subscribe capabilities, all based on a high performance, fully asynchronous messaging architecture. Integrated application management services lower total cost of ownership by allowing organizations to effectively manage their applications from a single point of control.

Unify VISION AppServer's companion product, Unify VISION AppBuilder, is an object-oriented, repository-based component framework that enables developers to rapidly create and easily modify application components. Its powerful, pre-built components shield developers from the complexities of the underlying technology, enabling them to focus on the business components and processes that make up the heart of their applications.

Unify VISION AppServer and AppBuilder support Microsoft Windows NT, Windows 95, Windows 98, and all leading UNIX server platforms. Client

support includes leading Web browsers running HTML or Java, and standard desktop applications. Unify VISION AppServer supports native database connectivity to all major RDBMS products.

About Sumitomo Metal Industries Ltd.

Sumitomo Metal Industries Ltd. (SMI) is a diversified manufacturer of steel products and a supplier of construction, plant and system engineering services, and is one of the world's largest steel manufacturers. It provides steel products for construction, transportation, energy, and other industries.

In addition, SMI owns many growing subsidiary Japanese companies in industries including construction, chemicals, energy, electronics, medical and biotechnology. With main offices in Tokyo and Osaka, plus branches throughout Japan and around the world, the company directly employs approximately 15,000 people. Company revenues were about US\$8.2 billion in 1997.

About Unify Corp.

Unify Corp. provides Internet application server solutions that enable corporations to deliver enterprise-networked applications by integrating legacy, custom-built, and packaged applications with the Internet.

Unify's professional services organization provides a full range of services to help customers successfully deliver their application initiatives. Unify's product line includes Unify VISION AppServer, Unify VISION AppBuilder, ACCELL/SQL and the Unify DataServer product family.

Headquartered in San Jose, Unify has direct sales offices throughout North America, Europe and Japan, with a network of distributors, VARs, OEMs, and systems integrators worldwide. Unify has over 375,000 users worldwide, including leaders in telecommunications, financial services, commercial industries and government. Unify product and service information is located on the World Wide Web at <http://www.unify.com>.

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10:03 EST FEBRUARY 2, 1999

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DESCRIPTORS: New Products & Services; Marketing; Company News

COUNTRY NAMES/CODES: Japan (JP) ; United States of America (US)

REGIONS: Asia; Far East; Pacific Rim; Americas; North America

PROVINCE/STATE: California

SIC CODES/DESCRIPTIONS: 3310 (Blast Furnace & Basic Steel Products); 7372
(Prepackaged Software)